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| 10/663,793 | 09/17/2003 | Jun Takeuchi | 33082M177 | 3772 |

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| EXAMINER | |
|---|---|
| BAREFORD, KATHERINE A | |
| ART UNIT | PAPER NUMBER |
| 1762 | |

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/663,793 | TAKEUCHI ET AL. | |
| | Examiner | Art Unit | |
| | Katherine A. Bareford | 1762 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *15 May 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) *5-8* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

1. The amendment of May 15, 2007 has been received and entered. With the entry of the amendment, claims 5-8 remain withdrawn from consideration and claims 1-4 remain pending for examination.

### *Election/Restrictions*

2. This application contains claims 5-8 drawn to an invention nonelected with traverse in the reply filed on October 5, 2006. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

### *Specification*

3. The objection to the abstract of the disclosure is withdrawn as it is now less than 150 words in length after the amendment of May 15, 2007.

### *Claim Rejections - 35 USC § 103*

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted state of the prior art in view of Rice et al (US 2003/0154919) and Japan 05-278038 (hereinafter '038).

The admitted state of the prior art, at pages 1-4 of the application, teaches that it is well known to provide an internal member to be disposed in a vacuum processing apparatus in the form of an electrostatic chuck. It is known to provide this electrostatic chuck with holes formed on the surface as gas injection holes. Furthermore, it is known to deposit a coating film of ceramic material onto the surface of this chuck by means of plasma spraying. Furthermore, the admitted state of the prior art teaches that in order to form the ceramic coating film on the chuck with gas injection holes, it is required that coating material not enter the holes. The admitted state of the prior art teaches that known methods of masking the holes would include using padding plugs of metal, which suffer from the problem of the coating material conjugating to the metal material

of the padding plugs, with removal of the plugs being a problem because they are welded to the coating film.

The admitted state of the prior art teaches all the features of this claim except the use of the metal padding plug coated with a metal-resin composite layer as claimed and removing the padding plugs after coating.

However, Rice teaches using a masking apparatus in a thermal spray process. Figure 4B and paragraphs [0040]—[0041]. In Rice, a cup 62 is provided as the mask that can be made of a material such as thin sheet metal including aluminum or steel that can withstand the temperature of droplets from the thermal spray device. Figure 4B and paragraphs [0040]-[0041]. Rice teaches that the cup can be further supplied with a coating to reduce the adherence of thermal spray droplets, such as TEFLON or a mold release coating. Paragraph [0044].

'038 teaches that a desirable mold release coating for a material such as steel is provided by electrolessly plating the mold with nickel containing 5-25 volume % polytetrafluoroethylene (PTFE), producing a coating of a composite of nickel metal and PFTE resin. See the Abstract. While an example has P also present, this is merely exemplary, and only nickel and PTFE are required.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the admitted state of the prior art to use metal padding plugs that have been coated with a nickel-PTFE release coating to mask the gas holes during coating as suggested by Rice and '038 in order to provide an metal padding plug

that does not stick to the coating material, as the admitted state of the prior art teaches the thermal spraying, by plasma spraying, of chucks with holes that need to be masked during spraying and that the use of metal padding plugs during spraying has the problem of the coating material conjugating to the metal material of the padding plugs, with removal of the plugs being a problem because they are welded to the coating film, and Rice teaches that thermal spray masking devices are desirably provided with a mold release coating to prevent thermal spray material from sticking to the masking device, and further teaches that TEFLON (also known as PTFE) is also a material to which thermal spray coatings do not stick, and '038 teaches that a desirable mold release coating is a combination of nickel and PTFE. Thus, the use of the suggested mold release coating on the masking padding plug will remove the problem of spray material conjugating or sticking to the plugs. It further would have been obvious to modify the admitted state of the prior art in view of Rice and '038 to remove the padding plugs after coating with an expectation of providing a desirable use of the chuck, because the plugs would need to be removed so that the gas injection holes could be used for injecting gas as desired.

7. Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted state of the prior art in view of Rice and '038 as applied to claim 1 above, and further in view of WO 01/54188 (hereinafter '188), Pico, deceased et al (US 4115507) and Sherstinsky et al (US 5634266).

**** The Examiner notes that '188 is in Japanese and therefore, Harada et al (US 2003/0007308) the US national stage application of '188 has been used as a translations, and column and line references are to Harada. ****

The admitted state of the prior art in view of Rice and '038 teaches all the features of these claims except (1) the surface material of the chuck (claims 2, 4), (2) the hole diameters (claims 2, 4), (3) the core member of steel wire (claims 2, 4), (4) the thickness of the metal-resin composite layer (claims 2, 4), (5) the projection of the plugs (claims 2, 4), (6) the multiple layers (to provide electrode layer embedded in insulating layer (claim 3). As to the core member material, Rice teaches that the base mask material to be coated can be steel, and '038 teaches that the substrate can be steel as discussed in the rejection above. As to the insulating material coating film, the admitted state of the art teaches that it is known to plasma spray aluminum oxide. Page 2. As to the electroless plating of nickel with fluoropolymer (PTFE) particles dispersed therein, this is taught by '038 as discussed in the rejection above.

'188/Harada teaches that it is known to provide an electrostatic chuck member with layers of insulating material of oxide ceramic such as aluminum oxide with an electrode layer applied between the aluminum oxide layers. Paragraph [0026] – [0027]. The chuck substrate surface material can be aluminum. Paragraph [0052]. A layer of nickel-aluminum alloy can be provided on that surface providing an aluminum alloy surface contacting the insulating layers. Paragraph [0052]. An aluminum oxide layer can be plasma sprayed over the aluminum and aluminum alloy surface. Paragraph

[0052]. Then a tungsten electrode layer is plasma sprayed over the aluminum oxide layer. Paragraph [0052]. Then another aluminum oxide layer is plasma sprayed over the tungsten layer. Paragraph [0052].

Pico teaches using masking plug to prevent coating areas of a substrate with perforations, or holes, with the plugs inserted into the perforations. Column 4, lines 50-55 and column 1, lines 25-35. The plugs extend past the substrate surface a distance desirably at least twice the thickness of the coating to be applied to facilitate removal of the plug after coating. Column 4, lines 55-65. The plugs can be metal and can be coated with a release agent to help prevent coating from sticking. Column 5, lines 1-15.

Sherstinsky teaches that when providing electrostatic chucks with gas injection holes, the holes can desirably be 0.5 mm, for example. Column 5, line 60 through column 6, line 10.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to (1) (6) modify the admitted state of the prior art in view of Rice and '038 to use aluminum/aluminum alloy surface materials and to provide an aluminum oxide insulating layer by plasma spraying, followed by a tungsten electrode layer by plasma spraying, followed by an aluminum oxide insulating layer by plasma spraying as suggested by '188 with an expectation of providing a desirable electrostatic chuck, because the admitted state of the prior art in view of Rice and '038 teaches to apply plasma sprayed material to an electrostatic chuck with cooling holes and to mask the cooling holes with plugs during spraying, and '188 teaches that a desirable

electrostatic chuck includes aluminum/aluminum alloy surface materials and an aluminum oxide insulating layer provided by plasma spraying, followed by a tungsten electrode layer provided by plasma spraying, followed by an aluminum oxide insulating layer provided by plasma spraying. It would have been obvious to use the padding plug process as taught by the admitted state of the prior art in view of Rice and '038 for each layer (during the tungsten layer application, metal plugs alone would be obvious to use if the tungsten does not stick as aluminum oxide would or the claimed metal plug would also read on the metal coated plug used with the aluminum oxide layers) in order to prevent blocking the holes during each process. (5) It would further have been obvious to modify the admitted state of the prior art in view of Rice, '038 and '188 to optimize the projection height of the plugs beyond the surface by routine experimentation as suggested by Pico in order to provide optimum plug removal, because the admitted state of the prior art in view of Rice, '038 and '188 teaches to use masking padding plugs during the coating and Pico teaches that when masking holes using plugs it is desirable to project them at least twice the height of the coating to be applied to allow for easy removal, which suggests optimizing the height of the plugs. (2) It would further have been obvious to modify the admitted state of the prior art in view of Rice, '038, '188 and Pico to use a hole diameter of 0.5 mm as suggested by Sherstinsky in order to provide desirable gas injection, because the admitted state of the prior art in view of Rice, '038, '188 and Pico teaches to use an electrostatic chuck with gas injection holes, and Sherstinsky teaches that electrostatic chuck gas injection holes

can desirably be 0.5 mm in diameter. (3) It would further have been obvious to modify the admitted state of the prior art in view of Rice, '038, '188, Pico and Sherstinsky to use steel wire as the core member, because the admitted state of the prior art teaches to use a metal base, Rice teaches to use a base masking material of steel, and Sherstinsky teaches that the holes to be plugged would only be 0.5 mm in diameter, and thus the base material would be steel in the shape of a wire. (4) It would further have been obvious to modify the admitted state of the prior art in view of Rice, '038, '188, Pico and Sherstinsky to optimize the coating thickness based on the size of the metal plug and holes to be coated and the amount of protection needed, as '038 teaches that particles of 1 micron of PTFE (abstract) can be used, thus allowing for a coating of 1 micron or more thickness.

*Response to Arguments*

8. Applicant's arguments filed May 15, 2007 have been fully considered but they are not persuasive.

(A) As to the rejection of claim 1 using the admitted state of the prior art in view of Rice and '038, the Examiner has reviewed applicant's arguments at pages 6-10 of the Remarks, however, the rejection is maintained. Applicant argues that '038 teaches a nickel-PTFE coating improves releasability of a rubber product formed in the mold, and thus only teaches that the nickel-PTFE coating is non-conjugative relative to rubber, not relative to ceramic, and does not teach that the provided nickel-PTFE coating would

have properties acceptable for thermal spray coating, and thus one of ordinary skill in the art would not have looked to '038 in a method involving thermal spray coating of ceramic as taught by "the admitted state of the prior art". Furthermore, applicant argues that claim 1 would not have been obvious over the admitted state of the prior art in view of Rice, as Rice only mentions the deposition of ceramic coatings by a thermal spraying process is well known, and this is the only mention Rice makes of a ceramic material, and thus, applicant argues, Rice does not teach the use of a ceramic coating material in connection with the invention therein. Furthermore, applicant argues that Rice provides a cup 62 with a separate layer that is not a metal-resin composite layer to provide non-conjugative behavior relative to the thermally sprayed coating. Also, applicant argues that the cup 62 in Rice is not a padding plug, and has different properties required than those of a hole-masking padding plug. Therefore, applicant argues that Rice would not have motivated one skilled in the at to use a metal-resin composite layer in a method involving thermal spray coating of such a metal-resin composite layer with a ceramic coating.

The Examiner disagrees with applicant's position. First, applicant has separately argued the combination of the admitted state of the prior art with '038 and the combination of the admitted state of the prior art and Rice. However, the rejection was made up of the combination of all three references. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references.

See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Instead one must look at the combination of the prior art as a whole. Here, the Examiner has first provided "the admitted state of the prior art", as discussed in the rejection above which provides the known use of padding plugs of metal, over which ceramic is thermally sprayed, as the primary reference. Furthermore, the Examiner has cited Rice, as showing the when thermal spraying it is well known to be beneficial to provide a PTFE (TEFLON) or mold-release coating over a metal masking material to "reduce the adherence of thermal spray droplets" (paragraph [0044]). While Rice only specifically mentions the term "ceramic" in regards to the thermal spray coating in paragraph [0002] as a well known thermal spray material, when read in context of the invention, for example in paragraph [0034] teaching that "Various coating materials may be utilized", with no limit as to what that material may be, it is clearly suggested that Rice is directed to conventional materials that one of ordinary skill in the art would expect to be thermally sprayed, which directs such a person back to the "well known" materials of paragraph [0002]. Thus, one of ordinary skill in the art would clearly expect the PTFE and mold-release materials of paragraph [0044] to be non-adherent to thermal spray droplets of well known coating materials as listed in paragraph [0002]. Thus, Rice does not teach away from the use of a ceramic coating with PTFE and mold-release non-adherent materials. Furthermore, while the cup 62 of Rice is not a padding plug, Rice does not teach away from the use of a non-adherent material as described in paragraph [0044] on a padding plug, since it is

simply described as a material to reduce adherence of thermal spray droplets. Thus, it is clearly the applied material (TEFLON or mold-release) that is designed to reduce adherence, not the shape of the cup 62, and it would be clear to one of ordinary skill in the art that such material would reduce adherence on various masking, including that of the admitted state of the prior art. As to Rice not teaching the combination PTFE-metal mold release, the Examiner notes that Rice alone does not teach this material. This is why '038 has been provided. However, Rice does direct one of ordinary skill in the art to using "mold release" materials in paragraph [0044]. Rice also clearly indicates that PTFE (TEFLON) can be acceptably used to reduce adherence of thermal spray droplets without a negative effect, and both Rice and the admitted state of the prior art note that metal can be thermally sprayed without being destroyed. Therefore, when one of ordinary skill in the art looks at known mold release coatings, such as '038, as directed by Rice, that person would understand that a metal-PTFE coating can be acceptably used in thermal spraying processes with the PTFE providing desirable non-adherence (non-conjugative) properties to thermal spraying and without the metal being destroyed, even though '038 does not specifically say so, based on the combination of all three references.

(B) As to the rejection of claims 2-4 using the admitted state of the prior art in view of Rice and '038 and further in view of '188, Pico and Sherstinsky, applicant argues at pages 10-11 of the Remarks, that these claims are allowable based on their dependence on claim 1 and '188, Pico and Sherstinsky do not cure the defects in the

rejection of claim 1 as discussed above. The Examiner has reviewed these arguments, however, the rejection is maintained, as the rejection of claim 1 has been maintained for the reasons given in section (A) above, and no further arguments have been provided as to the specifics of claims 2-4.

*Conclusion*

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine A. Bareford whose telephone number is (571) 272-1413. The examiner can normally be reached on M-F(6:00-3:30) with the First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone numbers

for the organization where this application or proceeding is assigned are (571) 273-8300 for regular communications and for After Final communications.

Other inquiries can be directed to the Tech Center 1700 telephone number at (571) 272-1700.

Furthermore, information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KATHERINE BAREFORD
PRIMARY EXAMINER